OTTAWA NATIONAL WILDLIFE REFUGE COMPLEX
(OTTAWA, CEDAR POINT, WEST SISTER ISLAND NWR'S)
OAK HARBOR, OHIO

ANNUAL WATER MANAGEMENT PROGRAM
1982

NATIONAL WILDLIFE REFUGE SYSTEM
FISH AND WILDLIFE SERVICE
U.S. DEPARTMENT OF THE INTERIOR

AREAS WHERE WATER LEVELS CAN BE CONTROLLED

Annual Water Management Program Year 1982

Refuge Ottawa NWR Water Unit Name or Number Pool 1

Maximum elevation permissible Est. 574

Flowline elevation of lowest drain structure 570

Elevation of general pool bottom (not borrow pit bottom) 569.5

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	571.4	570.8
15	571.4	570.8
Feb. 1	571.4	570.8
15	571.5	570.8
Mar. 1	571.4	570.7
15	571.3	570.4
Apr. 1	571.3	570.2
15	571.3	570.0
May 1	570.3	570.0
15	570.3	569.9
June 1	570.3	569.9
15	570.2	569.9
July 1	570.2	569.8
15	570.1	569.8
Aug. 1	570.0	569.8
15	570.0	569.8
Sept.1	570.1	569.9
15	570.2	570.0
Oct. 1	570.5	570.5
15	570.6	571.0
Nov. 1	570.7	571.0
15	570.7	571.0
Dec. 1	570.8	571.0
15	570.8	571.0
31	570.8	571.0

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1. An attempt was made to gravity drain excess spring water from Pool 1 in March. High Lake Erie water levels, spring rain, and a lack of an automatic water control structure with a flap to allow water to be removed only when Lake Erie water level is down precluded more than 2" being removed at one time. Pumping in late April with the use of a 16" Crisafulli pump removed about 1-2". Water was added in early fall by a water diversion from several ditches in connection with Rader Ditch rehabilitation. Fall precipitation added more water bringing Pool 1 up to a one foot depth.

Part 2. Water level was low enough in 1981 to allow a treatment with Rotenone to reduce the carp population. A complete kill did not occur due to the great depths in some of the borrow pits. Vegetation response was good in all sections except some open bays where carp have been a problem over the years. Waterfowl use of this pool in the fall was excellent with large flocks of pintails, widgeon, and mallards. The muskrat population is in good shape also with numerous houses throughout the vegetated portions of the marsh.

B.2. A statement of the objectives to the proposed water levels.

Pool 1 will be gravity drained as early as possible and allowed to remain dry all summer. A modification of Pool 1 structure with a flap in the fall of 1981 will allow automatic draining of this pool whenever Lake Erie water levels are down. It is hoped a better vegetation response will occur in bays previously kept turbid by carp. In the fall Pool 1 will be gravity filled up to a 1.5 foot depth. The water level will then be maintained stable at this level all winter.

Annual Water Management Program Year 1982

Refuge Ottawa NWR Water Unit Name or Number Pool 2a

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure 569.2

Elevation of general pool bottom (not borrow pit bottom) 568.5

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	569.7	570.5
15	569.7	570.5
Feb. 1	569.7	570.5
15	569.7	570.5
Mar. 1	569.7	570.5
15	569.8	570.4
Apr. 1	569.8	570.3
15	570.0	570.0
May 1	570.2	569.8
15	570.3	569.6
June 1	570.4	569.5
15	570.4	569.5
July 1	570.4	569.5
15	570.4	569.4
Aug. 1	570.3	569.4
15	570.2	569.3
Sept.1	570.2	569.3
15	570.3	569.3
Oct. 1	570.4	569.4
15	570.4	569.4
Nov. 1	570.4	569.5
15	570.4	569.6
Dec. 1	570.5	569.7
15	570.5	569.7
31	570.5	569.7

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1. Pool 2a was managed just as it was planned with water added in early May and then water levels maintained all year at that level. Fall precipitation added some water in October and November.

Part 2. Vegetation response in Pool 2a is not the quality as desired; in density as well as plant species composition. This pool received a fair number of waterfowl in the fall and a few more muskrat houses appeared this year over the previous year.

B.2. A statement of the objectives for the proposed levels.

Pool 2a will be lowered in April-May 1982 by gravity when Lake Erie water levels allow it. This will be accomplished by passing water through Pool 2b into Rader Ditch. Water will be maintained at a lower level all summer and fall precipitation will be allowed to raise levels in October but not as high a level as in 1981. This pool needs a better vegetative response to attract waterfowl so lower levels and lower drawdowns should improve conditions in the next few years.

Annual Water Management Program Year 19 82

Refuge Ottawa NWR Water Unit Name or Number Pool 2b

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure 569.2

Elevation of general pool bottom (not borrow pit bottom) 567.5

Date	A.1 Water Surface for Past Year — Water Surface Elevations	B.1 Planned Elevation for Program Year — Water Surface Elevations
Jan. 1	570.5	570.6
15	570.5	570.6
Feb. 1	570.5	570.6
15	570.6	570.6
Mar. 1	570.6	570.6
15	570.6	570.6
Apr. 1	570.7	570.5
15	570.8	570.2
May 1	570.9	570.0
15	570.9	569.8
June 1	570.9	569.2
15	570.9	570.0
July 1	570.8	570.5
15	570.8	570.5
Aug. 1	570.7	570.5
15	570.6	570.4
Sept. 1	570.5	570.3
15	570.5	570.3
Oct. 1	570.6	570.3
15	570.6	570.4
Nov. 1	570.6	570.5
15	570.6	570.5
Dec. 1	570.6	570.5
15	570.6	570.5
31	570.6	570.5

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1. Water was maintained high all year with some added in April-May prior to stocking it with northern pike and largemouth bass fingerlings as part of an experiment to reduce carp reproduction. Some water was also added in October for migrating waterfowl. Water levels fluctuate in this pool whenever water is added to Pool 2a or Pool 2c as it passes through this pool to fill the others. This occurred several times in 1981. Seining to determine fish composition and abundance and secchi disc reading to determine turbidity was undertaken in 1981.

Part 2. Vegetation response is very poor in this pool and abundant cottonwood and willow saplings are present around all edges. Water was maintained high in 1981 to reduce the spread of the woody vegetation.

B.2. A statement of the objectives for the proposed water levels.

Pool 2b will be lowered in April and May to facilitate lowering Pool 2a by passing its water through Pool 2b. After this is accomplished or around the end of May, Pool 2c will be lowered by putting its water into Pool 2b. This will bring Pool 2b up to reduce the spread of saplings. Water will be left high the rest of 1982 in Pool 2b.

Annual Water Management Program Year 1982

Refuge Ottawa NWR Water Unit Name or Number Pool 2c

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure 567.1

Elevation of general pool bottom (not borrow pit bottom) 568.5

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	569.8	570.3
15	569.8	570.3
Feb. 1	569.8	570.3
15	569.8	570.3
Mar. 1	569.8	570.3
15	569.9	570.4
Apr. 1	570.0	570.4
15	570.0	570.5
May 1	570.2	570.5
15	570.5	570.5
June 1	570.5	569.8
15	570.5	569.5
July 1	570.4	569.4
15	570.4	569.4
Aug. 1	570.3	569.3
15	570.1	569.1
Sept.1	570.1	569.1
15	570.1	569.2
Oct. 1	570.3	569.5
15	570.3	570.0
Nov. 1	570.3	570.0
15	570.3	570.0
Dec. 1	570.3	570.0
15	570.3	570.0
31	570.3	570.0

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1 Some water was added to this Pool in May prior to stocking it with northern pike and largemouth bass fingerlings as part of an experiment to reduce carp reproduction. Fish seining to determine fish composition and secchi disc readings to determine water turbidity was undertaken on this Pool several times in 1981.

Water was also added in October during the fall migration.

A borrow pit in the SE corner of this pool was used for clay for construction work in July and August on the Rader Ditch and 2 adjacent dikes.

Part 2 Vegetation response in Pool 2c far exceeded that of Pools 2a and 2b. Very little woody vegetation is present and some small pockets of smartweed have been expanding.

B.2. A statement of the objectives of the proposed water levels.

The water level will be lowered in late May by gravity discharge into 2b to encourage increased vegetative growth. The level will be maintained low until fall when it will be raised prior to fall migration.

Annual Water Management Program Year 19 82

Refuge Ottawa NWR Water Unit Name or Number Pool 3

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure Est. 569

Elevation of general pool bottom (not borrow pit bottom) 570.0

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	571.5	571.8
15	571.5	571.8
Feb. 1	571.5	571.8
15	571.5	571.8
Mar. 1	571.5	571.8
15	571.5	571.8
Apr. 1	571.6	571.9
15	571.7	571.9
May 1	571.8	572.0
15	571.8	572.0
June 1	571.8	572.0
15	571.8	572.0
July 1	571.8	572.0
15	571.7	571.9
Aug. 1	571.7	571.8
15	571.6	571.7
Sept.1	571.6	571.7
15	571.6	571.7
Oct. 1	571.7	571.8
15	571.8	571.8
Nov. 1	571.8	571.8
15	571.8	571.8
Dec. 1	571.8	571.8
15	571.8	571.8
31	571.8	571.8

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1 Pool 3 water levels gradually have increased since dike rehabilitation has repaired the broken dike on the North side. Previous to the rehabilitation, water fluctuated constantly depending on Lake Erie water level. A new water control structure is still needed to properly regulate this pool as well as more dike rehabilitation on the south and east dike.

Part 2 With the stable water levels, aquatic vegetation is returning to this pool. It had a good concentration of waterfowl in the fall of 1981 and increased muskrat population. This trend will continue in the next few years.

B.2 A statement of the objectives of the proposed water levels.

In 1982 Pool 3 water level will be left stable. Only gradual water level fluctuations will occur due to added precipitation or water evaporation in the summer. With the stable water levels, an increased vegetative response should continue to improve this pool.

Annual Water Management Program Year 19 82

Refuge Ottawa NWR Water Unit Name or Number Pool 6

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure Est. 569

Elevation of general pool bottom (not borrow pit bottom) 570.0

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	571.7	571.5
15	571.7	571.5
Feb. 1	571.7	571.5
15	571.7	571.5
Mar. 1	571.7	571.6
15	571.7	571.6
Apr. 1	571.8	571.7
15	571.8	571.7
May 1	571.7	571.7
15	571.7	571.7
June 1	571.6	571.7
15	571.6	571.7
July 1	571.5	571.7
15	571.5	571.6
Aug. 1	571.4	571.5
15	571.2	571.5
Sept.1	571.2	571.5
15	571.3	571.6
Oct. 1	571.4	571.6
15	571.5	571.7
Nov. 1	571.4	571.7
15	571.5	571.7
Dec. 1	571.5	571.7
15	571.5	571.7
31	571.5	571.7

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1. Due to a lack of funding for dike repair and a low fuel allocation to allow pumping, no water level manipulation occurred in this pool in 1981. Water levels fluctuated a bit due to precipitation adding some water and evaporation in the summer lowered levels some. Some water was pumped into the western portion of this unit when water was removed from around the goose hunting blinds during October and November.

Part 2. Emergent vegetation is very dense in many areas of this unit but need water on it to get utilization by muskrats. After pockets of vegetation are removed by the muskrats, waterfowl utilization will increase. Funding is needed to repair numerous small breaks and an increased fuel allocation to allow pumping to make this area functional instead of allowing it to "go wild". Woody vegetation is also increasing in many areas and will be serious threat if not controlled.

B.2. A statement of the objectives for the proposed levels.

Without funding this pool will be left at status quo with no water control. This will mean low muskrat levels, low waterfowl utilization and an increase in the spread of woody vegetation. This pool is adjacent Magee Marsh Wildlife Area so proper funding to improve this pool and pump water would show tremendous benefits with waterfowl useage.

Annual Water Management Program Year 19 82

Refuge Ottawa NWR Water Unit Name or Number Moist Soil Unit 3

Maximum elevation permissible Est. 575

Flowline elevation of lowest drain structure Est. 567

Elevation of general pool bottom (not borrow pit bottom) Est. 571.5

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		Leave flooded until May 31.
15		
Mar. 1		
15		
Apr. 1	Shallow water from precipitation.	
15		
May 1		Lower ditch and allow clogged tile to pop open and then mark tile.
15		
June 1	Drained with U6 pump.	Drain unit and plug the open tile.
15		
July 1		
15		
Aug. 1		
15		
Sept. 1		
15		Reflood to 1' depth.
Oct. 1	Flooded 1' depth using Crisafulli pump and tractor.	
15		
Nov. 1		
15		
Dec. 1	Left flooded all winter.	Leave flooded all winter.
15		
31		

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1 Shallow water from spring precipitation was removed with the U6 pump in June. Water was kept off all summer for moist soil developement and then approximately one foot added in October with a Crisafulli pump and tractor. (No electricity to new MS pumping station yet). Water was left in this unit for the remainder of 1981.

Part 2 This was the first year of conversion of this area into a moist soil unit. There is very little woody vegetation in this unit to cause any problems. Most of the vegetation is upland grassland species but repeated flooding should change the unit to moist soil species. Heavy waterfowl useage occurred in early November.

B.2. A statement of the objectives for the proposed levels.

MSU-3 will be left flooded until May 1 for spring migration. The main ditch to the south of this unit will then be lowered so uneven water levels will cause clogged field tile to pop open.

June 1 all water in MSU-3 will be gravity drained into MSU-4 and 5. All open tile will then be cut off and plugged with the backhoe. This unit will be gravity flooded as much as possible in October and then pumped up to a 1' level if funding will allow it.

didn't flood because Air Guard was still working

Annual Water Management Program Year 1982

Refuge Ottawa NWR Water Unit Name or Number Moist Soil Unit 4

Maximum elevation permissible Est. 574

Flowline elevation of lowest drain structure Est. 567

Elevation of general pool bottom (not borrow pit bottom) Est. 570.5

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		
15		
Mar. 1		
15		
Apr. 1	Shallow water from precipitation.	Gravity flood as much as possible from Lake Erie.
15		
May 1		
15		
June 1	Drained with U6 pump.	Leave flooded for woody vegetation control.
15		
July 1		
15		
Aug. 1	Precipitation removed with U6 pump.	
15		
Sept. 1	Precipitation removed with U6 pump.	
15		
Oct. 1		
15	Fall precipitation floods unit 2-3" deep.	
Nov. 1		
15		
Dec. 1		Leave flooded all winter.
15		
31		

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels for the ecology of the management unit.

Part 1 As water accumulated in MSU-4 in 1981 it was removed with the U6 pump to facilitate either chopping with a Batwing mower or discing with a Rome disc. Clogged tile which might open later and drain MSU-4 were cut off and sealed using a backhoe. In late October fall precipitation was allowed to add 2-3" water over much of the unit and was left on for the remainder of 1981.

Part 2 A majority of this unit is covered by woody vegetation so a major effort was made in 1980 and 1981 to chop or disc it in an attempt to knock it back before flooding. This unit had a good population of deer using it as a result of the woody vegetation. Also some useage by geese occurred after chopping allowed grass to green out.

B.2. A statement of the objectives for the proposed levels.

This unit will be gravity flooded as much as possible from MSU-3 and then from Lake Erie in early spring. Pumped into last week of May It will then be left flooded all year to knock back the growth of woody vegetation. If left unflooded, abundant sprouting would occur in areas chopped and disced in 1981, leaving a denser stand of woody vegetation than before.

Annual Water Management Program Year 1982

Refuge Ottawa NWR Water Unit Name or Number Moist Soil Unit 5

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure 567

Elevation of general pool bottom (not borrow pit bottom) Est. 570

Date	A.1 Water Surface for Past Year (1981) Water Surface Elevations	B.1 Planned Elevation for Program Year (1983) Water Surface Elevations
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		
15		
Mar. 1		
15		
Apr. 1	Shallow water from precipitation.	Gravity flood as much as possible from Lake Erie.
15		
May 1		
15		
June 1	Drained with U6 pump.	Leave flooded for woody vegetation control.
15		
July 1	Precipitation removed with U6 pump.	
15		
Aug. 1	Precipitation removed with U6 pump.	
15		
Sept. 1	Precipitation removed with U6 pump.	
15		
Oct. 1		
15	Fall precipitation floods unit 2-3" deep.	
Nov. 1		
15		
Dec. 1	Shallow water left in over winter.	Leave flooded all winter.
15		
31		

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1 This unit was managed in 1981 the same as MSU-4. Water was removed with the U6 pump as it accumulated from precipitation throughout the summer. A subdividing dike was started by the National Air Guard but very little was accomplished. Flap gates were added to the MSU-4/5 dike in the main ditch to allow better water control when draining or filling one unit and not the other. Also some chooping of woody vegetation was accomplished in late summer. Fall precipitation added several inches of water to this unit which was left on into the winter.

Part 2 This unit is almost completely covered be woody vegetation so a portion of this unit was chopped to knock back its growth. A good deer population uses this unit and geese used the mowed areas as grass grew up. Most of this unit still needs to be chopped or flooded as soon as possible to reduce the woody vegetation or this unit will be lost as a moist soil unit.

B.2. A statement of the objectives for the proposed levels.

To stop the growth and spread of woody vegetation in this unit, it will be kept flooded all 1982 as soon as water can be added. Pumped in wk of 6/14 With a reduced fuel allocation only a small portion will be flooded completely to eliminate woody growth. This will be accomplished with gravity if Lake Erie allows it. If the budget would be increased or fuel allocation increased more of this unit could be managed properly.

Annual Water Management Program Year 1982

Refuge Ottawa NWR Water Unit Name or Number Moist Soil Unit 6

Maximum elevation permissible Est. 572

Flowline elevation of lowest drain structure 567

Elevation of general pool bottom (not borrow pit bottom) 570

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		
15		
Mar. 1		
15		
Apr. 1		
15		
May 1	Minimal water level fluctuations all year due to precipitation	
15	and evaporation.	
June 1		
15		
July 1		
15		
Aug. 1		
15		
Sept. 1		
15		
Oct. 1	Attempt to add water in October but dikes leak to bad from	
15	muskrat runs.	
Nov. 1		
15		
Dec. 1		
15		
31		

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1 No water control structure is present in this moist soil unit and lack of sufficient funds in 1980 when a pumping station was built adjoining it did not allow hooking up to it. Minimal water level fluctuations occurred in 1981 due to precipitation and evaporation. An attempt to add water in October 1981 using a Crisafulli pump failed when poor dikes with muskrat runs caused leakage.

Part 2 This unit has a very excellent dense stand of cattail but water is needed to get utilization by muskrats and waterfowl. The small pockets of water that was present had active muskrat cabins and had heavy useage by waterfowl all fall. With additional water the muskrats would move in and open up other pockets for use by waterfowl.

B.2. A statement of the objectives for the proposed levels.

Lack of funding will probably not allow this unit to be improved in 1982. A lack of funding to repair the dike and add a pipe extension from the moist soil pump station, lack of funding to pump water as well as a low fuel allocation exist. This unit has tremendous potential for wildlife useage if only water could be added as the vegetation already is in excellent condition.

Annual Water Management Program Year 19 82

Refuge Ottawa NWR Water Unit Name or Number Moist Soil Unit 7(a,b,c,)

Maximum elevation permissible Est. 572

Flowline elevation of lowest drain structure Est. 568

Elevation of general pool bottom (not borrow pit bottom) Est. 570

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		
15		
Mar. 1		Winter buildup of water.
15		
Apr. 1	Spring precipitation.	Spring precipitation.
15		
May 1		
15		
June 1	Excess water removed.	Drain by gravity and with farm unit pump.
15		
July 1		
15		
Aug. 1		
15	Water lowered for goose hunting blinds.	
Sept. 1		
15		
Oct. 1	Fall precipitation raised water in units.	Gravity flood.
15		
Nov. 1		
15		
Dec. 1	Water left in units over winter.	Hold water in units through the winter.
15		
31		

Note: All elevations I.G.L.D.

A.2. Effects of past year's water level on the ecology of the management unit.

Part 1 Water from winter snow and spring precipitation was left to allow a build up for spring migration. Excess water was removed June 1 and whenever necessary to keep levels below that which would damage Q3 Residence and the Butternut Lodge Complex. Water levels were also lowered in early fall for the controlled goose hunt. This allowed mowing areas adjacent to the blinds and easier accessibility of the hunters to blinds.

Part 2 Moist soil plant conversion in MSU 7a and 7b has shown excellent results so far. Pockets of water year round in lower portions of the unit was utilized by wading birds such as Great blue heron and Great Egrets all summer as well as by waterfowl in the spring and fall. Muskrat houses have increased in both units also. MSU 7c was farmed in 1980 with soybeans and buckwheat so 1981 was the first year as a moist soil unit. Almost the entire unit was covered with smartweed but the crop was not utilized properly without water on the unit.

B.2. A statement of the objectives for the proposed levels.

Water levels will be allowed to build up from winter and spring precipitation and then gravity drained June 1 with additional amounts pumped out with stationary farm unit pumps. October 1, the units will be gravity filled as much as possible and held all winter at that level. Low level dikes to subdivide the units and tubes with water control structures are needed to make these moist soil units functional, however reduced funding in 1982 will not allow it.

Pumped unit 7b

Built "Q-3" dike Though

Annual Water Management Program Year 1982

Refuge Ottawa NWR Water Unit Name or Number Moist Soil Unit 8a

Maximum elevation permissible Est. 571

Flowline elevation of lowest drain structure Est. 569

Elevation of general pool bottom (not borrow pit bottom) Est. 569.5

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1	1/3 area covered with water	
15	all winter.	
Mar. 1		Unit still flooded from 1981.
15		
Apr. 1	15" water added with Crisafulli	
15	pump.	
May 1		
15		Gravity drain as much as possible.
June 1		Completely drain with electric
15		farm unit pump.
July 1	Unit left flooded all year.	
15		
Aug. 1		
15		
Sept. 1		
15		Gravity flood as much as possible.
Oct. 1		
15		
Nov. 1		
15		
Dec. 1		
15		
31		

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1 This unit was last farmed in 1979. In 1980 it was left idle with some mowing of strips in late summer prior to gravity flooding one third of the unit. In 1981 the whole area was flooded by adding 15" with a Crisafulli pump and left flooded the whole year.

Part 2 A variety of wildlife species used this unit throughout the year. Species such as muskrats, Great blue herons, Great Egrets, Canada geese, as well as numerous other waterfowl species. Vegetative response was slow with separate areas of emergent vegetation throughout the unit but a majority of it being open water. Water was left high all year to leach out chemicals from farming and to change plant species composition from upland plants and weeds associated with farming to aquatic/moist soil species.

B.2. A statement of the objectives for the proposed levels.

Water will be left on this unit until May when it will be gravity drained as much as possible and the remainder will be pumped out with an electric farm pump in June. A moist condition will be maintained all summer to stimulate moist soil plant developement. This unit will be gravity flooded as much as possible in late September and left flooded through the winter.

Annual Water Management Program Year 1982

Refuge Ottawa NWR Water Unit Name or Number Moist Soil Unit 8b

Maximum elevation permissible Est. 571

Flowline elevation of lowest drain structure No drain installed yet.

Elevation of general pool bottom (not borrow pit bottom) Est. 569.5

Date	A.1 Water Surface for Past Year — Water Surface Elevations	B.1 Planned Elevation for Program Year — Water Surface Elevations
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		
15		
Mar. 1	Winter and spring precipitation removed with stationary electric pump.	
15		
Apr. 1		
15		
May 1		Winter and spring precipitation removed with stationary pump in late May.
15		
June 1	Farmed in 1981	
15		
July 1		
15		
Aug. 1		Construction work if funding is available to make unit functional as a moist soil unit.
15		
Sept. 1		
15		
Oct. 1		Fall precipitation allowed to accumulate on unit.
15		
Nov. 1		
15		
Dec. 1		
15		
31		

Note: All elevations I.G.L.D.

A.2. Effects of past year's water level on the ecology of the management unit.

Part 1 No water management on this unit in 1981 except to pump winter and spring precipitation off to farm it. 1981 was the last year it was farmed.

Part 2 Farmed. Excellent useage by geese of waste grain after harvesting and standing refuge crops in winter.

B.2. A statement of the objectives for the proposed levels.

In 1982 winter and spring precipitation will be removed with a stationary electric pump in late May.

If funding is available several tubes and water control structures will be installed to change this area from a farm unit to a moist soil unit without flooding out adjacent woodlots. Also a low level dike is needed around one small woodlot and the visitor parking lot to eliminate flooding of these areas. Fall precipitation will be allowed to accumulate and flood unit as much as possible.

built in '82 6/30

Pumped full Nov. 19 "Birds Galore"

Annual Water Management Program Year 1982

Refuge Ottawa NWR Darby Division Water Unit Name or Number Pool 1

Maximum elevation permissible 573.5

Flowline elevation of lowest drain structure 566.6

Elevation of general pool bottom (not borrow pit bottom) 569.0

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	571.6	571.7
15	571.6	571.7
Feb. 1	571.6	571.7
15	571.6	571.7
Mar. 1	571.7	571.7
15	571.8	571.7
Apr. 1	571.9	571.8
15	571.9	571.8
May 1	571.8	571.8
15	571.7	571.6
June 1	571.7	571.3
15	571.7	571.2
July 1	571.7	571.2
15	571.6	571.2
Aug. 1	571.4	571.2
15	571.3	571.1
Sept.1	571.2	571.1
15	571.2	571.1
Oct. 1	571.2	571.4
15	571.2	571.6
Nov. 1	571.7	571.7
15	571.7	571.7
Dec. 1	571.7	571.7
15	571.7	571.7
31	571.7	571.7

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1. Excess water was removed by gravity draining in late April. With the water control structure set to continue draining whenever Lake Erie lowered enough, pool 1 was lowered 0.7' by late August. October 15 the water structures were reversed and water gravity filled the pool, when Lake Erie water level was up. 0.5' was added by November 1 when the water control structures were closed for the year.

Part 2. This pool is the most important pool at Darby at this time. It has the greatest number of muskrat houses and had the greatest useage by waterfowl in the fall. The pool has a good interspersion of cattail/reeds and open water with only a few large open areas devoid of emergent vegetation.

B.2.1 A statement of the objectives for the proposed levels.

Plans for 1982 include lowering the pool 6" in May by gravity discharge then gravity filling the 6" in late September.

Annual Water Management Program Year 1982

Refuge Ottawa NWR Darby Division Water Unit Name or Number Pool 2

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure Est. 569

Elevation of general pool bottom (not borrow pit bottom) 570.0

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	570.8	571.2
15	570.8	571.2
Feb. 1	570.8	571.2
15	570.8	571.2
Mar. 1	570.8	571.2
15	570.8	571.2
Apr. 1	570.9	571.2
15	571.0	571.3
May 1	571.0	571.3
15	571.1	571.3
June 1	571.1	571.3
15	571.1	571.2
July 1	571.1	571.2
15	571.1	571.1
Aug. 1	571.0	571.0
15	570.9	570.9
Sept. 1	570.8	570.9
15	570.8	570.9
Oct. 1	570.8	570.9
15	570.9	571.0
Nov. 1	571.0	571.2
15	571.1	571.2
Dec. 1	571.2	571.2
15	571.2	571.2
31	571.2	571.2

Note: All elevations I.G.L.D.

A.2. Effect of past year's water levels on the ecology of the management unit.

Part 1. Shallow water left in this pool over winter plus spring and fall precipitation accounted for the only water available for the pool in 1981. Water could not be added to this pool from Lake Erie as the connecting ditch would also add water to Pool 4 which was being lowered in 1981. Three tubes connect this ditch with Pool 4 and only plywood sheets block them causing bad leakage. Funding is needed to put flaps on these tubes.

Part 2. This pool has a good stand of emergent vegetation but more water is needed to get better utilization by muskrats. Without a good drawdown to stimulate a growth of seed producing plants such as smartweed, only small numbers of waterfowl use this pool.

B.2. A statement of the objectives for the proposed levels.

No water management can occur with Pool 4 tubes without flaps in the same ditch which flows past Pools 2 and 3. Hopefully, funding will allow rehabilitation of Pool 4 tubes and then Pool 2 can be flooded in late September.

3 they were
Flap on 48"
others removed

Annual Water Management Program Year 1982

Refuge Ottawa NWR Darby Division Water Unit Name or Number Pool 3

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure Est. 569

Elevation of general pool bottom (not borrow pit bottom) 570.0

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	570.8	570.8
15	570.8	570.8
Feb. 1	570.8	570.8
15	570.8	570.8
Mar. 1	570.8	570.8
15	570.8	570.8
Apr. 1	570.8	570.8
15	570.9	570.8
May 1	570.9	570.9
15	570.9	570.9
June 1	570.9	570.9
15	570.9	570.9
July 1	570.9	570.9
15	570.8	570.9
Aug. 1	570.7	570.8
15	570.6	570.6
Sept.1	570.6	570.6
15	570.6	570.6
Oct. 1	570.6	570.7
15	570.7	570.7
Nov. 1	570.8	570.8
15	570.8	570.8
Dec. 1	570.8	570.8
15	570.8	570.8
31	570.8	570.8

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1. This pool also has the same water management problems as Pool 2. It cannot be gravity filled or drained without affecting Pool 4 water level. No water manipulation of Pool 3 occurred in 1981. Very little water was present except for precipitation in small pockets.

Part 2. An excellent growth of emergent vegetation such as cattails and reeds exist in this pool. The main problem is a lack of water to enable muskrats to utilize the vegetation and to open up pockets for waterfowl. This pool has the thickest growth of vegetation of all four pools but the least amount of water.

B.2. A statement of the objectives for the proposed levels.

No water management will occur in this pool in 1982 unless funding will be available to repair Pool 4 tubes. With flaps added to Pool 4 tubes, then water can be added or removed from Pool 2 and 3 without changing Pool 4 water level. Water should be added to Pool 3 in 1982 if the rehabilitation is finished.

Annual Water Management Program Year 1982

Refuge Ottawa NWR Darby Division Water Unit Name or Number Pool 4

Maximum elevation permissible 573.5

Flowline elevation of lowest drain structure 566.6

Elevation of general pool bottom (not borrow pit bottom) 567.5

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	570.0	571.0
15	570.0	571.0
Feb. 1	570.0	571.0
15	570.2	571.0
Mar. 1	570.5	571.0
15	570.6	571.0
Apr. 1	570.7	571.2
15	570.8	571.4
May 1	570.7	571.0
15	570.8	570.0
June 1	570.9	569.0
15	570.9	568.5
July 1	571.0	568.0
15	571.0	568.0
Aug. 1	571.0	568.0
15	571.0	568.0
Sept. 1	571.1	568.2
15	571.2	568.4
Oct. 1	571.4	569.0
15	571.2	569.5
Nov. 1	570.9	569.5
15	570.9	569.5
Dec. 1	571.0	569.5
15	571.0	569.5
31	571.0	569.5

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1. An attempt was made in 1981 to lower the water level in Pool 4 first by gravity draining and then by pumping with both a Crisafulli and a Ford pump. With a low fuel allocation a serious effort to lower the pool was not possible.

Part 2. This pool is in very poor shape with very little vegetation except on the edges. The majority of the pool is a large open pool of water with an abundant carp population. Waterfowl use this pool only as a temporary resting place as very little food exist except on the edges. The muskrat population also is very low.

B.2. A statement of the objectives for the proposed levels.

If funding is available this pool will be pumped down as low as possible June 1 and then rehabilitation to tubes connecting this pool to a ditch with access to Lake Erie. One collapsed tube will be removed and flaps will be added to the others to enable water to be added or removed from Pools 2 and 3 without changing the water level in Pool 4. The carp will be eliminated by Rotenone when the water is down. If vegetation does not return sufficently, then the pool may be left low over winter to allow better response next year.

Annual Water Management Program Year 1982

Refuge Ottawa NWR Navarre Division Water Unit Name or Number Pool 1

Maximum elevation permissible Est.573

Flowline elevation of lowest drain structure No Data

Elevation of general pool bottom (not borrow pit bottom) 568.5

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	571.5	571.6
15	571.5	571.6
Feb. 1	571.4	571.6
15	571.5	571.6
Mar. 1	571.5	571.6
15	571.5	571.6
Apr. 1	571.1	571.0
15	570.8	570.0
May 1	570.4	569.0
15	570.0	569.0
June 1	570.4	569.0
15	570.3	569.0
July 1	570.2	569.0
15	570.3	569.0
Aug. 1	570.3	569.0
15	570.3	569.0
Sept.1	571.5	569.0
15	571.5	569.0
Oct. 1	571.5	570.0
15	571.5	571.0
Nov. 1	571.5	571.0
15	571.5	571.0
Dec. 1	571.6	571.0
15	571.6	571.0
31	571.6	571.0

Note: All elevations I.G.L.D.

A.2. Effects of past year's water level of the ecology for the management unit.

Part 1 Water manipulation as planned for 1981 was not accomplished or followed by Davis Besse Nuclear Plant personnel. Almost the whole drawdown was accomplished in April instead of only excess in April with a complete drawdown in June as planned. Also 1½ foot of water was added already by September 1 instead of small increments of 4-6" starting in October. A meeting will have to be held with Davis Besse personnel to emphasis to them the importance of following water management plans as written by us.

Part 2 This pool is in fair condition but it still doesn't have a vegetative response as desired. Large areas of open water exist with very little emergent vegetation. Also very little seed producing plants important to waterfowl such as smartweed are present.

B.2. A statement for the objectives for the proposed levels.

In 1982 this pool will be pumped completely dry right away after spring break up and then it will be kept dry all summer. Small pockets will be pumped out with small portable pumps if available to eliminate any carp present. Water will be added October 1 instead of the end of August as in 1981. This pool will then be left flooded all winter.

Annual Water Management Program Year 1982

Refuge Ottawa NWR Navarre Division Water Unit Name or Number Pool 2

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure No Data

Elevation of general pool bottom (not borrow pit bottom) 568.5

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	572.0	571.9
15	572.0	571.9
Feb. 1	572.0	571.9
15	572.2	571.9
Mar. 1	572.4	571.8
15	572.4	571.8
Apr. 1	572.1	571.8
15	570.8	571.8
May 1	570.0	571.7
15	570.3	571.7
June 1	570.3	569.5
15	570.2	569.0
July 1	570.2	569.0
15	570.3	569.0
Aug. 1	570.2	569.0
15	570.2	569.0
Sept.1	571.0	569.0
15	571.4	569.0
Oct. 1	571.6	569.5
15	571.7	571.0
Nov. 1	572.0	571.5
15	572.0	571.5
Dec. 1	572.0	571.5
15	571.7	571.5
31	571.9	571.5

Note: All elevations I.G.L.D.

A.2. Effects of past year's water level on the ecology of the management unit.

Part 1. Water management as planned for this pool in 1981 also was not followed by Davis Besse Nuclear Plant personnel. Two foot of water was removed in April instead of a partial drawdown in April-May and a complete drawdown in June. 1.4' of water was added before October 1 instead of adding water October 1 as planned. Over half of it of 0.8' was added already in August.

Part 2. This pool also rates from fair to poor in vegetative response as desired. A large open expanse of water has shown an increase in water pond lily and American lotus which both block out sunlight thus reducing the growth of submerged aquatic plants important to many waterfowl species. Waterfowl useage especially by coot and American widgeon both decreased in 1981. One good stand of rice cut grass and smartweed in the pool had moderate useage by pintails and mallards. This stand however also had decreased useage from that of 1980.

B.2. A statement of the objectives for the proposed water levels.

In 1982 the water level will be left high until May 15 for migrating waterfowl and then a complete drawdown by pumping from May 15-June 1. Periodic pumping will be required throughout the summer to remove water added from precipitation. Small pockets of water will be pumped with portable pumps if available to eliminate carp and reduce the spread of American lotus. Water will be added in late September and early October and left on all winter.

Annual Water Management Program Year 19 82

Refuge Cedar Point NWR Water Unit Name or Number Pool 1

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure 568

Elevation of general pool bottom (not borrow pit bottom) 569.0

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	571.6	572.0
15	571.7	572.0
Feb. 1	571.8	572.0
15	571.9	572.0
Mar. 1	571.0	572.0
15	570.5	572.0
Apr. 1	570.5	572.0
15	570.4	572.0
May 1	570.6	572.0
15	570.5	571.6
June 1	570.4	571.6
15	570.4	571.6
July 1	570.3	571.6
15	570.3	571.6
Aug. 1	570.2	571.6
15	570.1	571.6
Sept.1	570.0	571.6
15	570.6	571.6
Oct. 1	571.3	572.0
15	571.6	572.0
Nov. 1	571.8	572.0
15	571.9	572.0
Dec. 1	571.9	572.0
15	571.9	572.0
31	572.0	572.0

Note: All elevations I.G.L.D.

A.2. Effects of past year's water level on the ecology of the management unit.

Part 1. 1981 was an exceptionally good year for this pool as an early spring breakup followed with favorable wind conditions which lowered Lake Erie allowed this pool to gravity drain more than past years. The lower pool level allowed emergent vegetation to expand in many areas and to reestablish itself on previously unexposed mudflats. In late September the gates were reversed so water could be added to Pool 1 by gravity whenever Lake Erie was up. The maximum elevation desired for over winter was reached by November 15.

Part 2. Waterfowl usage was above average all fall due to the tremendous vegetative response caused by the good drawdown. The conditions haven't been so favorable for such a good drawdown for many years. Although emergent vegetation expanded tremendously there still remains several large open pockets of water where carp cause problems, and other areas where the American lotus has expanded. Both suppress the growth of submergent aquatic plants, the carp by its rooting action and by causing the water to be turbid so light doesn't penetrate and the American lotus by its shading effect.

B.2. A statement of the objectives for the proposed levels.

Water level in this pool will be lowered 6" in May and held at that level all summer. 6" will then be gravity added in late September. Water will be kept at 572.0 all winter.

Annual Water Management Program Year 1982

Refuge Cedar Point NWR Water Unit Name or Number Pool 2

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure 569

Elevation of general pool bottom (not borrow pit bottom) 569.0

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	571.6	571.8
15	571.6	571.8
Feb. 1	571.6	571.8
15	571.6	571.8
Mar. 1	571.6	571.8
15	571.6	571.8
Apr. 1	571.7	571.9
15	571.7	571.9
May 1	571.7	571.9
15	571.7	571.9
June 1	571.7	571.9
15	571.7	571.8
July 1	571.7	571.8
15	571.6	571.7
Aug. 1	571.5	571.6
15	571.5	571.5
Sept.1	571.4	571.4
15	571.4	571.4
Oct. 1	571.6	571.5
15	571.7	571.7
Nov. 1	571.8	571.7
15	571.8	571.7
Dec. 1	571.8	571.8
15	571.8	571.8
31	571.8	571.8

Note: All elevations I.G.L.D.

A.2. Effects of past year's water level on the ecology for the management unit.

Part 1 No water manipulation was possible with this pool in 1981. The water control structure has been silted in with sand on the lake side since 1980. Wave action has deposited a layer of sand several feet thick into and above the outflow tube. Some type of alteration of the protective rock barrier around the tube is needed to direct the water to remove the sand near the tube outlet instead of depositing sand.
Pool level changes were minor ones due to precipitation and evaporation.

Part 2 This pool is in fair condition with an interspersion of cattail/ burreeds and open pockets of water typical of a wetland area. However the pool not having a drawdown stage due to the plugged water structure is lacking good seed producing plants such as smartweed and rice cut grass. Also not being able to drain large pockets of open water has allowed carp to root out existing plants and keep the water turbid so others can't start.

B.2. A statement of the objectives for the proposed level.

Due to lack of funding this pool will have to go without water control again in 1982. Precipitation and evaporation will cause minor fluctuations in the water level.

Annual Water Management Program Year 19 82

Refuge Cedar Point NWR Water Unit Name or Number Pheasant Farm

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure Est. 568

Elevation of general pool bottom (not borrow pit bottom) 569

A.1 Water Surface for Past Year

B.1 Planned Elevation for Program Year

Date	Water Surface Elevations	Water Surface Elevations
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		
15		
Mar. 1		
15		
Apr. 1		
15		Gravity add water
May 1	Gravity remove excess water.	Pump full with Crisafulli pump.
15		
June 1		
15		Hold full all year.
July 1		
15		
Aug. 1		
15		
Sept. 1	Attempt gravity filling.	
15		
Oct. 1		
15	Add water with Crisafulli pump.	
Nov. 1		
15		Hold full all winter.
Dec. 1		
15		
31		

Note: All elevations I.G.L.D.

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1. Excess water was gravity removed in May through a new structure added in 1980. With high Lake Erie levels and a screw gate structure without a flap to let water out but not in, only a small amount was removed. Again in September low Lake Erie water levels made gravity filling this pool unsuccessful. In late October water was added by using a Crisafulli pump.

Part 2. Emergent vegetation such as cattails and reeds are returning after a high muskrat population ate out a majority of the marsh in 1979. A low enough drawdown wasn't accomplished in 1981 to get much smartweed so only minor useage by waterfowl occurred.

Purple loosestrife is spreading rapidly in this unit with some plants all along the north dike and a major, solid stand on the east side.

B.2. A statement of the objectives to the proposed water levels.

In 1982 some water will be gravity added if possible but most of it will be added with a Crisafulli pump. The pool will be flooded deep to try to reduce the spread of the purple loosestrife and then held high all year.

AREAS WHERE WATER LEVELS CANNOT BE CONTROLLED.

Ottawa National Wildlife Refuge Pool 4 and 5

A. Water conditions the past year.

Water fluctuates constantly in both Pool 4 and Pool 5 dependent on the level of Lake Erie. Both pools have broken dikes caused by wind generated seiches in 1972 and 1973. Wave action year after year has gradually eroded away at the remaining dikes. Plans still exist to rehabilitate the dikes around Pool 4 but Pool 5 which has the most dike damage, is not planned for rehabilitation per the Refuge Master Plan.

B. The effects of water conditions on the area.

The pools are in very poor condition with Lake Erie water going in and out of both pools causing the water levels to change whenever the wind changes speed or direction.

With unstable water levels, plant growth is very restricted and only in small sheltered pockets. Water levels sometimes reach two or more feet while other times its non-existant with only mudflats. Wildlife useage of these areas also varies tremendously. Wading birds will be numerous one day while mudflats exist and waterfowl will be present other days when the water is in. With the unstable water levels, food production is minimal so waterfowl only use it for a resting area and muskrats very seldom use it without enough vegetation.

Ottawa National Wildlife Refuge Pool 7 and 8

A. Water conditions the past year.

Water levels fluctuate constantly in both these pools whenever Lake Erie water level changes. Breached dikes due to wind generated swiches of Lake Erie plus constant wave action has caused dikes to deteriorate to the extent that water passes freely from Crane Creek into these pools. Per the Refuge Master Plan, Pool 7 is not planned to be repaired but Pool 8 may be repaired if funding is available in the future.

B. The effects of water conditions on the area.

Vegetation is confined to woody shrubs on remnant dikes, and scattered clumps of cattails and reeds in sheltered locations. With water constantly fluctuating, new vegetation is hard pressed to get established. Very little food production occurs so wildlife use the pools for loofing and resting sites. Shorebirds use.the area when the water is down where as waterfowl use the area when the water comes up. With unstable water levels and a lack of vegetation, muskrat populations are very low, being confined to old dike remnants.

West Sister Island National Wildlife Refuge

A. Water conditions the past year.

No water management occurs on this unit. It is designated a Wilderness Area and has water level fluctuation on its shoreline due to changes in Lake Erie water level as the wind changes speed and direction. Minor changes would also take place on its surface as precipitation and evaporation levels change each year.

B. The effects of water conditions on the area.

Management of this unit is confined only to protection, as it is a Wilderness Area. The vegetation changes that occur on the island are due to seasonal as well as long term changes in the weather patterns. Large stands of hackberry and poison ivy in association with one of the largest heronry in the Great Lakes Region dominates the Island.